

Security threats and attacks on IoT devices

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Abstract

The Internet of Things (IoT) has become an integral part of modern digital infrastructure, connecting a wide range of devices such as smart home appliances, wearable technologies, healthcare systems, industrial sensors, vehicles, and critical infrastructure. Although IoT provides significant benefits through automation, connectivity, and real-time data exchange, its rapid expansion has introduced serious security and privacy challenges. Many IoT devices operate with limited computational resources, inadequate security configurations, weak authentication mechanisms, outdated software, and insufficient protection against unauthorized access. These vulnerabilities make IoT environments attractive targets for cybercriminals and malicious actors. This paper examines major security threats and attacks affecting IoT devices, including malware, botnets, distributed denial-of-service (DDoS) attacks, spoofing, eavesdropping, man-in-the-middle attacks, credential-based attacks, data breaches, and device hijacking. It also discusses the potential consequences of compromised IoT systems, including data loss, privacy violations, service disruption, financial damage, and threats to physical safety. Particular attention is given to the challenges associated with securing heterogeneous and widely distributed IoT networks. The study further highlights the importance of strong authentication, encryption, secure communication protocols, regular software updates, network segmentation, intrusion detection, and effective access-control mechanisms. A comprehensive security strategy combining technological solutions, secure device design, user awareness, and continuous monitoring is essential for building resilient IoT ecosystems. Addressing these challenges is crucial for ensuring the safe, reliable, and privacy-preserving adoption of IoT technologies across diverse applications.

Keywords: Internet of Things, IoT Security, Cybersecurity, Security Threats, Cyber Attacks, Malware, Botnets, DDoS Attacks, Privacy, Authentication, Data Protection.